CLAIM

1   I claim:

1. A multiparameter method of screening for the
diagnosis, the prevention or the treatment of
atherosclerosis-related coronary heart disease
5 (CHD) or stroke comprising;

defining the disease as atherosclerosis-related CHD
or stroke;

defining the normal as free from said disease;

defining the following parameters as
10   atherosclerotic parameters consisting of c = the
        Low-density lipoprotein (LDL) concentration
        parameter in mg/dL or c = the C-reactive protein
        (CRP) concentration parameter in mg/L, p = the
        blood systolic pressure parameter in mmHg or p =
15   the blood diastolic pressure parameter in mmHg, f
        = the heart rate parameter in s^{-1}, a = the radius
        parameter of arterial vessels in cm, T = the
        temperature parameter of blood plasma in °C, α =
        the angle parameter of arterial vessels in degree
20   and z = the axial position parameter of
        diffusional flux in cm, called diffusional length;

an individual having the measured values of said

atherosclerotic parameters of the following expressions:

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$$J = A c^{\frac{11}{9}} (v^3 D^{16})^{\frac{1}{27}} \left(\frac{g\cos\alpha + fu}{z} \right)^{\frac{2}{9}}$$ (1.1)

or

$$J = B c^{\frac{11}{9}} p^{\frac{1}{3}} T^{\frac{16}{27}} a^{\frac{2}{3}} f^{\frac{2}{9}} z^{-\frac{2}{9}}$$ (1.2)

and

$$J = E\, c^{\frac{11}{9}} D^{\frac{16}{27}} z^{-\frac{2}{9}} (\cos\alpha)^{\frac{2}{9}}$$ (1.3)

30   wherein J = the mass transfer flux in 10^{-5} g/(cm^{2}s),
A, B and E = the variables that are independent of
said atherosclerotic parameters, v and u = the
variables related to said p and said a, D = the
diffusion coefficient in cm^2/s, and g = the

35   gravitational acceleration;

determining the normal values of said atherosclerotic
parameters;

determining the disease risks yielded by the
differences between said measured values and said

40   normal values of said atherosclerotic
parameters;

adding all said disease risks together yields a total
risk of said disease;

determining a disease risk level containing said

45 total risk of said disease;

  selecting an atherosclerotic risk factor related to
   an atherosclerotic parameter that is the greatest
   contribution to said total risk of said disease so
   as to result in said risk factor as a primary
50 therapy target of said disease;

  selecting a greater flux between the LDL mass
   transfer flux and the monocyte mass transfer flux
   so as to result in said greater flux as a primary
   cause in said disease;

55 selecting a greater concentration level between the
   LDL level in serum and the CRP level in blood
   plasma so as to result in said greater level as a
   secondary therapy target of said disease;

  determining a relative ratio between currently said
60 total risk and previously said total risk so as to
   yield said relative ratio as a therapeutic
   efficacy of said disease;

  repeating above-mentioned said methods until said
   disease risk level is reduced to a normal level
65 for said individual who requires the therapy to
   prevent or to treat atherosclerosis-related CHD or
   stroke; and

above-mentioned said methods are written as an

executable computer program named the MMA.exe

70   © 2004, by X.F. Wang to perform said methods.

2. A method as in claim 1 wherein determining said

disease risk yielded by the difference between the

measured value and the normal value of said LDL

concentration parameter, said method comprising the

75 steps of:

a measured value, c_m in mg/dL, of the individual's

LDL concentration in human serum is determined

using a medical technique for measuring the

concentration of blood constituents or said c_m is

80   determined by the physician;

a normal value, c_n in mg/dL, of said LDL

concentration is determined by the physician or

said $c_n = 100$ mg/dL for adult;

substituting said c_m and said c_n into the following

85   expression where $c_m \geq c_n$:

$$R_1 = \left(\frac{c_m}{c_n}\right)^{\frac{11}{9}} - 1 \qquad (1)$$

and

calculating (1) yields said disease risk R_1 caused by

said LDL concentration parameter related to the

90   atherosclerotic risk factors being an elevated LDL
concentration in human serum, high-fat diet,
hypercholesterolemia or other risk factors that
increase said LDL concentration.

3. A method as in claim 1 wherein determining
95 said disease risk yielded by the difference between the
measured value and the normal value of said CRP
concentration parameters, said method comprising the
steps of:

a measured value, c_m in mg/L, of the individual's CRP
100   concentration in human blood plasma is determined
using a medical technique for measuring the
concentration of blood constituents or said c_m is
determined by the physician;

a normal value, c_n in mg/L, of said CRP concentration
105   and an equivalent factor, F, are determined by the
physician wherein $F = \left(\dfrac{D_c}{D_L} \right)^{\frac{16}{27}}$, D_C = the CRP diffusion
coefficient and D_L = the LDL diffusion coefficient
or said c_n = 1.0 mg/L for adult and
said F = 0.66;

110   substituting said c_m, said c_n and said F into the
following expression where $c_m \geq c_n$:

$$R_2 = F \left(\left(\frac{c_m}{c_n} \right)^{\frac{11}{9}} - 1 \right) \qquad (3)$$

and

115   calculating (3) yields said disease risk R_2 caused by said CRP concentration parameter related to the atherosclerotic risk factors being an elevated CRP level in human blood plasma, systemic inflammation, infectious agents or other risk factors that increase said CRP level.

120   4. A method as in claim 1 determining said disease risk yielded by the difference between the measured value and the normal value of said blood systolic pressure parameter, said method comprising the steps of:

125   a measured value, p_m in mmHg, of the individual's blood systolic pressure is determined using a medical technique for measuring the human blood pressure or said p_m is determined by the physician;

a normal value, p_n in mmHg, of said systolic pressure
130   is determined by the physician or said $p_n = 120$ mmHg for adult;

substituting said p_m and said p_n into the following expression where $p_m \geq p_n$:

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$$R_4 = \left(\frac{R_m}{R_n}\right)^{\frac{1}{3}} - 1 \qquad\qquad (4)$$

135 and

calculating (4) yields said disease risk R_4 caused by
said systolic pressure parameter related to the
atherosclerotic risk factors being an elevated
level of blood systolic pressure, family history
140 of hypertension or other risk factors that
increase said systolic pressure.

5. A method as in claim 1 wherein determining said
disease risk yielded by the difference between the
measured value and the normal value of said blood
145 diastolic pressure parameter, said method comprising
the steps of:

a measured value, p_m in mmHg, of the individual's
blood diastolic pressure is determined using a
medical technique for measuring the human
150 blood pressure or said p_m is determined by the
physician;

a normal value, p_n in mmHg, of said blood diastolic
pressure is determined by the physician or said
p_n = 70 mmHg for adult;

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155 substituting said p_m and said p_n into the following
expression where $p_m \geq p_n$:

$$R_5 = \left(\frac{R_m}{R_n}\right)^{\frac{1}{3}} - 1 \qquad\qquad (5)$$

and

calculating (5) yields said disease risk R_5 caused by
160 said diastolic pressure parameter related to the
atherosclerotic risk factors being an elevate
level of blood diastolic pressure, family history
of hypertension or other risk factors that
increase said diastolic pressure.

165 6. A method as in claim 1 wherein determining said
disease risk yielded by the difference between the
measured value and the normal value of said heart rate
parameter, said method comprising the steps of:

a measured value, f_m in s^{-1}, of the individual's
170 heart rate is determined using a medical technique
for measuring the human heart rate or said f_m is
determined by the physician;

a normal value, f_n in s^{-1}, of said heart rate is
determined by the physician or said $f_n = 72 \ s^{-1}$
175 for adult;

substituting said f_m and said f_n into the following

expression where $f_m > f_n$:

$$R_6 = \left(\frac{f_m}{f_n}\right)^{\frac{2}{9}} - 1 \qquad\qquad (6)$$

and

180   calculating (6) yields said disease risk R_6 caused by

said heart rate parameter related to the

atherosclerotic risk factors being an elevated

level of heart rate, smoking cigarette, depression

or other risk factors that increase said heart

185   rate.

7. A method as in claim 1 wherein determining said

disease risk yielded by the difference between the

measured value and the normal value of said arterial

radius parameter, said method comprising the steps of:

190   a measured radius value, a_m in cm, of the

individual's arterial vessel at the lesion-prone

sites of arterial bifurcations, arterial

branching, arterial curvatures or arterial

tapering is determined using a medical technique

for measuring the sizes of arterial vessels or

195   said a_m is determined by the physician;

a normal value, a_n in cm, of said arterial radius is

determined by the physician or said a_n = a value

between 0.2 cm and 2.2 cm for adult;

200   substituting said a_m and said a_n into the following expression where $a_m \geq a_n$:

$$R_7 = \left(\frac{a_m}{a_n}\right)^{\frac{2}{3}} - 1 \qquad\qquad (7)$$

and

calculating (7) yields said disease risk R_7 caused by
205   said arterial radius parameter related to the atherosclerotic risk factors being an increased size of arterial radius at said lesion-prone sites or other risk factors that increase the size of said arterial radius.

210   8. A method as in claim 1 wherein determining said disease risk yielded by the difference between the measured value and the normal value of said plasma temperature parameter, said method comprising the steps of:

215   a measured temperature value, T_m in °C, of the individual's plasma fluid in the region at said lesion-prone sites is determined using a medical technique for measuring the temperature of human blood plasma or said T_m is determined by the
220   physician;

a normal value, T_n in °C, of said plasma temperature
is determined by the physician or said T_n = 37°C;

substituting said T_m and said T_n into the following
expression where $T_m \geq T_n$:

225 $$R_8 = \left(\frac{T_m}{T_n}\right)^{\frac{16}{27}} - 1 \qquad\qquad (8)$$

and

calculating (8) yields said disease risk R_8 caused by
said plasma temperature parameter related to the
atherosclerotic risk factors being an elevated
230 temperature of said human blood plasma at said
lesion-prone sites, elevated body temperature-
related diseases or other risk factors that
increase said plasma temperature.

9. A method as in claim 1 wherein determining said
235 disease risk yielded by the difference between the
measured value and the normal value of said angle
parameter, said method comprising the step of:

a measured value, α_m in degree, of the angle between
gravity and the average velocity of the blood
240 fluid in the region at said lesion-prone sites is
determined using a medical technique for measuring
the human arterial geometries or said α_m is
determined by the physician;

a normal value, α_n in degree, of said angle is

245   determined by the physician or said α_n = a value

between the 10° and 60° for adult;

substituting said α_m and said α_n into the following

expression where $\alpha_n \geq \alpha_m$:

$$R_9 = \left(\frac{\cos \alpha_m}{\cos \alpha_n} \right)^{\frac{2}{9}} - 1 \qquad (9)$$

250   and

calculating (9) yields said disease risk R_9 caused by

said angle parameter related to the

atherosclerotic risk factors being a reduced size

of said angle or other risk factors that reduce

255   said angle size.

10. A method as in claim 1 wherein determining said

disease risk yielded by the difference between the

measured value and the normal value of said axial

position parameter of the diffusional flux, said method

260 comprising the steps of:

a measured value, z_m in cm, of the individual's axial

position of diffusional flux along the inner

arterial wall at said lesion-prone sites is

determined using a medical technique for measuring

265   the human arterial geometries or said z_m is

        determined by the physician;

        a normal value, z_n in cm, of said axial position is

        determined by the physician or said z_n = a value

        between 0.10 cm and 1.00 cm;

270   substituting said z_m and said z_n into the following

        expression where $z_m \leq z_n$:

$$R_{10} = \left(\frac{z_n}{z_m}\right)^{\frac{2}{9}} - 1 \qquad\qquad (10)$$

        and

        calculating (10) yields said disease risk R_{10}

275   caused by said axial position parameter related

        to the atherosclerotic risk factors being a

        decrease in said axial position of the diffusional

        flux or other risk factors that decrease said

        axial position.

280   11. A method as in claim 1 wherein adding said R_1 in

        claim 2 through said R_{10} in claim 10 together yields a

        total risk of said disease consisting;

        a current total risk of said disease related to the

        currently measured values of said atherosclerotic

285   parameters; and

a previous total risk of said disease related to the previously measured values of said atherosclerotic parameters.

290   12. A method as in claim 1 wherein determining said disease risk level containing said total risk of said disease in claim 11, said method comprising the steps of:

dividing the disease risk level into the following seven risk sublevels: $0.84 \geq$ first disease risk
295   level ≥ 0.00, $1.75 \geq$ second disease risk level > 0.84, $2.70 \geq$ third disease risk level > 1.75, $3.70 \geq$ fourth disease risk level > 2.70, $4.70 \geq$ fifth disease risk level > 3.70, $5.80 \geq$ sixth disease risk level > 4.70 and seventh disease risk level $>$
300   5.80; and

selecting a disease risk level containing said total risk of said disease in claim 11 from among seven of said disease risk sublevels.

13. A method as in claim 1 wherein selecting an
305   atherosclerotic risk factor related to the atherosclerotic parameter that is the greatest contribution to said total risk of said disease in claim 11 so as to result in said risk factor as a

primary therapy target of said disease.

310   14. A method as in claim 1 wherein selecting said
greater flux between said LDL mass transfer flux
and said monocyte mass transfer flux so as to result in
said greater flux as a primary cause in said
disease, said method comprising the steps of:

315   selecting said LDL mass transfer flux as a primary
cause in said disease when said R_1 in claim 2 $\geq$
said R_2 in claim 3; or

selecting said monocyte mass transfer flux as a
primary cause in said disease when said R_1 in claim
320   2 < said R_2 in claim 3.

15. A method as in claim 1 wherein selecting said
greater concentration level between said LDL level in
human serum and said CRP level in human blood plasma
so as to result in said greater level as a secondary
325 therapy target, said method comprising the steps of:

selecting said LDL level in serum as secondary
therapy target of said disease when said R_1 in
claim 2 $\geq$ said R_2 in claim 3; or

selecting said CRP level in blood plasma

330   as a secondary therapy target of said disease when said R_1 in claim 2 < said R_2 in claim 3.

16. A method as in claim 1 wherein determining said relative ratio between said current total risk of said disease and said previous total risk of said

335 disease in claim 11 so as to yield said relative ratio as a therapeutic efficacy of said disease.

17. A method as in claim 1 wherein repeating said method in claim 2 through said method in claim 16 until said disease risk level is reduced to a normal

340 level for said individual who requires the therapy to prevent or to treat atherosclerosis-related CHD or stroke.

18. A method as in claim 1 wherein said method in claim 2 through said method in claim 16 are written as

345 an executable computer program named said MMA.exe to perform said methods which comprises:

      inputting the currently measured values, the previously measured values and the normal values of the individual's atherosclerosis parameters

350   into the input screen of said MMA.exe;

      pressing the "update" button and the "calc. risk" button of said input screen; and

pressing the "evaluate" button so as to yield an
output screen containing a total risk of said

355   disease, a primary cause in said disease, a
primary therapy target of said disease, a
secondary therapy target of said disease and a
therapeutic efficiency for said individual who
requires the diagnosis, the prevention or the

360   treatment of atherosclerosis-related CHD or
stroke.